

WPGM 2010 Abstract

Title: Sources and losses of ring current ions

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Abstract

During geomagnetic quiet times, in-situ measurements of ring current energetic ions (few to few tens of keVs) from THEMIS spacecraft often exhibit multiple ion populations at discrete energies that extend from the inner magnetosphere to the magnetopause at dayside or plasma sheet at nightside. During geomagnetic storm times, the levels of fluxes as well as the mean energies of these ions elevated dramatically and the more smooth distributions in energies and distances during quiet times are disrupted into clusters of ion populations with more confined spatial extends. This reveals local plasma heating processes that might have come into play. Several processes have been proposed. Magnetotail dipolarization, sudden enhancement of field-aligned current, local current disruptions, and plasma waves are possible mechanisms to heat the ions locally as well as strong convections of energetic ions directly from the magnetotail due to reconnections. We will examine two geomagnetic storms on October 11, 2008 and July 22, 2009 to reveal possible heating mechanisms. We will analyze in-situ plasma and magnetic field measurements from THEMIS, GOES, and DMSP for the events to study the ion pitch angle distributions and magnetic field perturbations in the auroral ionosphere and inner magnetosphere where the plasma heating processes occur.

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